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(56) Documents Cited:
EP 1013301 A1 WO 1994/026206 A
US 6053900 A US 5554114 A
US 4531933 A US 20010053890 A1

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(54) Abstract Title: Aortic catheter with preformed helically coiled section

(57) An aortic catheter which aligns easily with a small central aortic valve orifice. The catheter includes a proximal hub end with screw thread connector 1 fixed to a hollow tube section 2 which upon removal of a straightening wire 6 assumes a preformed distal helical coiled section 3 about an axis of predetermined radii which enables the catheter to brace itself against the inner wall of the aorta 7 and yet maintain central and axial alignment of its distal straight section 4 and end tip port 5 with a small central aortic valve orifice 8 in order that this orifice may then be crossed by flexible guide wire 9.

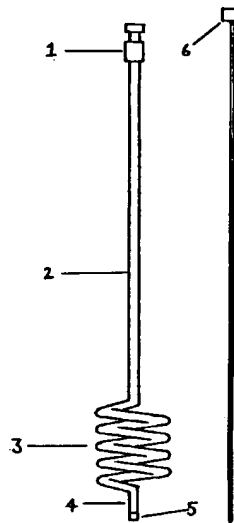


FIGURE 2

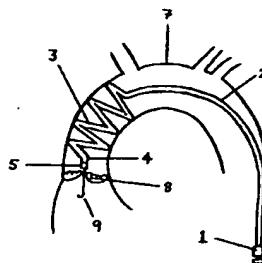


FIGURE 4

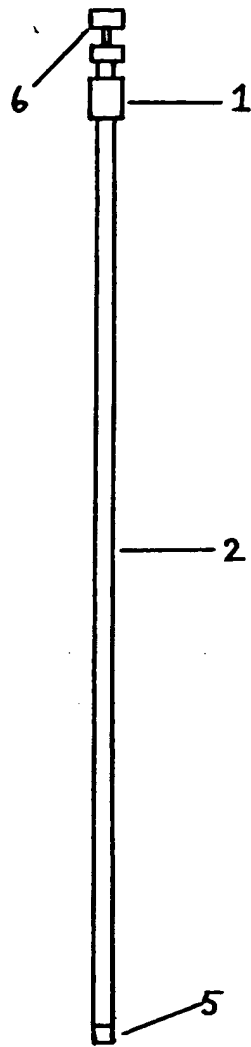


FIGURE 1

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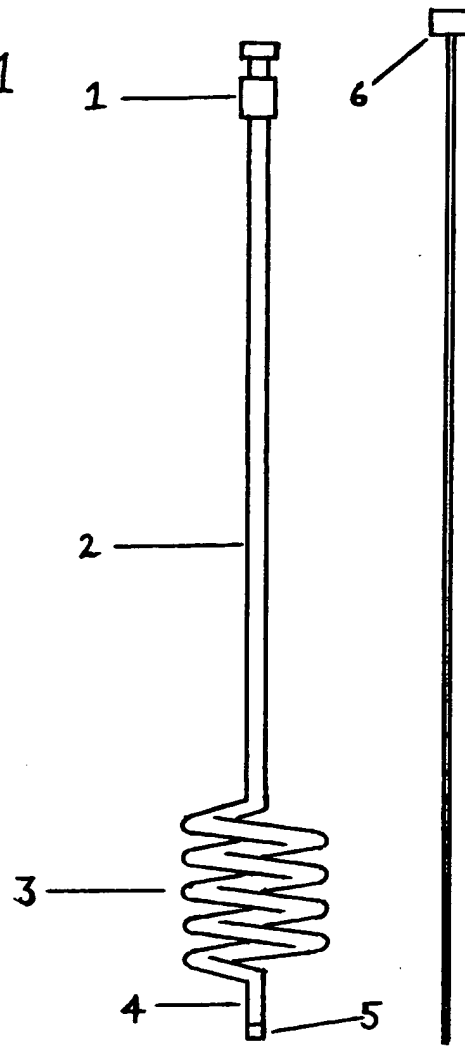


FIGURE 2

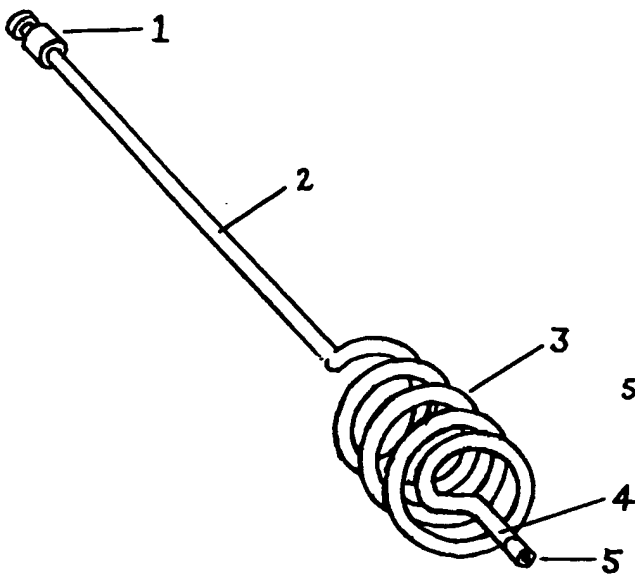


FIGURE 3

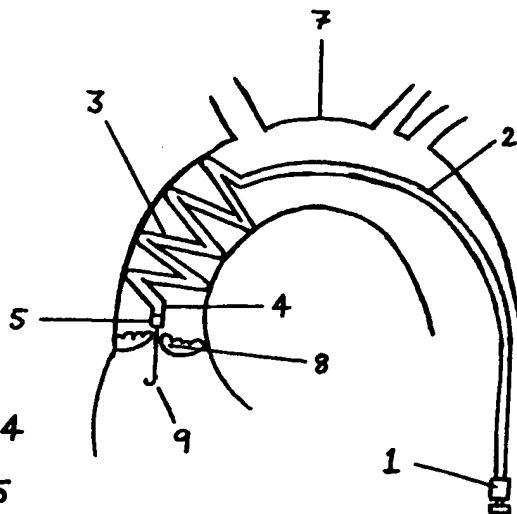


FIGURE 4

AORTIC CATHETER

This invention relates to an aortic catheter of the type which is intended for use in cardiological catheterisation techniques and angiographic procedures.

Angiographic catheters are well known and well established tools used in medical and surgical investigations and procedures. Such catheters are comprised of a hollow tube of varying lengths and callibres. The proximal hub end includes a screw thread for connecting to parts of other medical equipment. The distal end is made of a variety of preformed shapes and having an end port.

The problem with present cardiological catheters is that it is often extremely difficult, if not impossible, to manoeuvre them across the small central orifice, or narrow central constriction of a heavily calcified and stenosed aortic valve.

According to the present invention there is provided a cardiac angiographic catheter comprising a hollow tube catheter with small central lumen comprising a proximal hub end with screw thread connector, a straight central section and the essential technical feature which is unique to this invention, a distal preformed helical coiled section which is adapted to brace itself against the inner wall of the aorta and has a distal central axial straight section with end tip port whose sole purpose is to enable easy passage of a flexible guide wire and hence subsequent catheters across a stenosed aortic heart valve.

Preferably the catheter is made of plastics material.

A specific embodiment of the invention will now be described by way of example

with reference to the accompanying drawings in which :-

FIGURE 1 shows a side view of the whole catheter including the distal preformed helical coiled section with straightening wire inside the entire length of the catheters central lumen.

FIGURE 2 shows a side view of the whole catheter including the distal preformed helical coiled section after straightening wire removal.

FIGURE 3 shows in perspective the distal preformed helical coiled section after straightening wire removal.

FIGURE 4 is a cut-away view of the aorta showing the catheter position after straightening wire removal and flexible guide wire crossing the stenosed aortic valve.

Referring to the drawings the catheter comprises a proximal hub section with screw thread connector 1, a straight hollow tube section 2, a distal pre-formed section in the form of a helical coil of predetermined radii and length 3, a centrally and axially aligned end section 4 and end tip port 5.

In order to position the catheter within the aorta a straightening guide wire 6 is slid along its entire inner lumen starting at the proximal hub end 1. The now straightened catheter, as illustrated in Fig 1, can then be advanced along the aorta 7. Once the catheter is in the desired position within the aorta, as illustrated in Fig 4, the straightening wire 6 is removed and the catheter assumes its preformed helical coiled shape 3, as illustrated in Fig 2-4, gripping the inner wall of the aorta 7 and with distal end tip port 5 aligned axially with the centre of the aortic valve orifice 8 to be crossed. Passage of a flexible guide wire 9 is then possible down the inner lumen of the catheter without interruption of its preformed helical coiled shape 3. As this

flexible guide wire exits the end tip port 5 it becomes straight once more and is aligned with the central axis of the aortic valve orifice 8. The flexible guide wire 9 is advanced further so that it crosses the small central orifice 8. The straightening wire 6 is then passed down the inner lumen of the catheter once more but with the flexible guide wire 9 still in place. As the catheter becomes straight once again, as illustrated in Fig 1, it can then be withdrawn from the aorta 7 along with the straightening wire 6 but with the flexible guide wire 9 remaining in place across the small central aortic valve orifice 8. Other conventional preformed catheters can then be slid down over the flexible guide wire 9 and across the small central aortic valve orifice 8 in order to conduct the desired investigation(s), ie; to measure left ventricular pressures and pull-back pressure gradients to determine if a patient needs an aortic valve replacement.

CLAIMS

1. **A hollow tube catheter with small central lumen comprising a proximal hub end with screw thread connector, a straight central section and the essential technical feature which is unique to this invention, a distal preformed helical coiled section which is adapted to brace itself against the inner wall of the aorta and has a distal central axial straight section with end tip port whose sole purpose is to enable easy passage of a flexible guide wire and hence subsequent catheters across a stenosed aortic heart valve.**
2. A catheter as claimed in Claim 1 but being of various lengths and various callibres.
3. A catheter as claimed in Claim 1 where the preformed distal helical coiled section has various radii about its central axis and various lengths.
4. A catheter as claimed in Claim 1 where the central axial straight end section has various lengths.
5. A catheter as claimed in Claim 1 which incorporates braiding within the plastics material it is composed of which gives it added torque for improved manipulation.
6. A catheter as claimed in Claim 1 which incorporates radiopaque markers.
7. A catheter as claimed in Claim 1 which incorporates an active hydrophilic coating.

8. A catheter as claimed in any proceeding claim which is made from plastics material, for example polyethylene, nylon, or from a combination of these materials.
9. A catheter substantially as herein described and illustrated in the accompanying drawings.



Application No: GB 0304989.7
Claims searched: 1-8

Examiner: Hayley Yates
Date of search: 12 August 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X:Y	X:1 Y:5, 6, 7	US 5554114	Wallace et al; see figure 1, column lines 62- 67
Y	6	WO 94/26206	Target Therapeutics; see figure 1, see claim 14 and page 6, lines 10-20
Y	7	EP 1013301 A1	Piolax Medical Devices, Inc, and [0035] (page 4)
Y	5	US 6053900	Brown et al, claim 2, column 12, lines 22-24
A		US 2001/0053890 A1	Osborne; see figure 2
A		US 4531933	Norton et al; see figure 4

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art
Y Document indicating lack of inventive step if combined with one or more other documents of same category	P Document published on or after the declared priority date but before the filing date of this invention
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^v:

A5R

Worldwide search of patent documents classified in the following areas of the IPC⁷ :

A61M

The following online and other databases have been used in the preparation of this search report :

JAPIO, WPI, EPODOC